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Abstract

Mobile technologies have enabled marketers to target consumers anywhere and anytime. However, as consumers react and respond differently depending on what situation they are in, there is an apparent need to determine when, where, and what kind of advertisement is most relevant to the consumer. Prior studies have found evidence on the influence of contextual factors such as location, time, and consumer behavior to the effectiveness of mobile ads but there has been little empirical evidence that examines contextual factors simultaneously. This paper proposes a holistic approach to examine the response of consumers when faced with two types of contextual factors (environmental and consumer contexts) through the lens of the Mobile Advertising Effectiveness Framework. Additionally, the influence of advertisement type (push- vs. pull-based) to these factors, along with the interactions among the variables are also investigated to determine which factors elicit the best response from consumers.

Keywords

Mobile ad response, contextual factors, advertisement type, environment context, purchase needs

Introduction

Mobile technologies have become inextricably bound up with modern lifestyle. This trend is expected to significantly proliferate as mobile devices diffuse rapidly. One industry forecast company has found that the number of smartphone users worldwide was 2.9 billion in 2018 and will grow to reach 3.5 billion in 2020.[1] Moreover, about 73% of internet users are expected to access the web exclusively through their smartphones by 2025.[2] Therefore, companies are concentrating their marketing budget to mobile-based promotion, reaching $190 billion in mobile advertising spending in 2019 and $280 billion by 2022.[3]

Mobile advertising has unique properties compared to traditional advertising. Mobile technologies enable "ubiquitous access capability" which users can access whenever and wherever they want (Bang et al. 2013, p. 6). This makes marketing communications via mobile devices an attractive option for marketers (Wehmeyer 2007). Additionally, the mobile device provides targeted advertisements that ensure the right person receives the right message at the right time (Adam 2002) through deriving relevant personal information from users including location, time, behavior, and preferences.

Context, defined by Abowd et al. (1999) as any information used to characterize the situation of an entity that is relevant to the interaction between a user and an application, is an important factor in determining

[1] https://www.statista.com/statistics/330695/number-of-smartphone-users-worldwide/

[2] https://www.cnbc.com/2019/01/24/smartphones-72percent-of-people-will-use-only-mobile-for-internet-by-2025.html

[3] https://www.statista.com/statistics/303817/mobile-internet-advertising-revenue-worldwide/

the effectiveness of advertising. Prior studies have examined the extent to which contextual factors such as physical location (Ghose et al. 2018), location characteristics (Andrews et al. 2016, Hong and Im 2018, and Ghose et al. 2016), time of day (Phang et al. 2019), and consumer behavior (Fong et al. 2015) affect the effectiveness of mobile ads and have found significant support for the influence of contextual variables.

Existing literature focuses on a limited view of context, thus, there has been little to no empirical evidence that examines the interrelationship of various contextual factors on the effectiveness of mobile advertising. To address this gap, this study examines the relationship among two types of contextual factors, advertisement type, and consumer's response to mobile ads. The research questions are as follows:

1. How do contextual factors affect consumer's response to mobile ads?
2. How do these contextual factors interact to affect consumer's response to mobile ads?
3. Does advertisement type influence the effect of context variables on consumer's mobile ad response?

Theoretical Background

We draw on the Mobile Advertising Effectiveness Framework of Grewal et al. (2016) comprised of environmental and technological context factors, consumers' stage in the shopping process, market factors, ad elements, and outcome metrics. Table 1 shows a summary of five representative mobile ad literature examining the effect of contextual factors.

Paper	Variables	Metric	Findings
Andrews et al. (2016)	Crowdedness	Redemption	Commuters in crowded subway trains are twice likely to respond to a mobile offer than in noncrowded trains
Ghose et al. (2018)	Trajectory (user's offline movement)	Redemption	Trajectory-based mobile targeting achieved higher coupon redemption rates and higher revenues.
Hong and Im (2018)	Temporal captivity	Mobile ad opening	Users are more receptive to mobile ads under captive transit conditions, more so under additional temporal conditions.
Ghose et al. (2019)	Commuting	Redemption	Commuters are about 3x likely to redeem a coupon than noncommuters. Multi-coupon distribution increased redemption by noncommuters.
Phang et al. (2019)	Time of day	Response to message	Utilitarian value presented in the morning is more appealing while hedonic value is more appealing in the afternoon.

Table 1. Summary of Prior Studies on Contextual Factors and Mobile Ad Response

Environmental Context

Environmental context is characterized depending on *where* and *when* a mobile advertisement is delivered (Grewal et al. 2016). Location characteristics that relate to activities and interactions of a user or system are found to provide more meaningful location information than actual geographical location (Arminen 2006). For our purposes, we look at the consumer's surroundings through crowdedness and neighborhood effect which could likely influence his or her response to mobile advertisements.

Crowdedness is the degree of population density or number of people per unit area (Stokols 1972). Andrews et al. (2016) test the effects of physical crowdedness on the subway setting and find that commuters in crowded subway trains are about twice as likely to respond to a mobile offer than those in noncrowded trains. Hong and Im (2018) also provides evidence that users under captive transit conditions, more so when presented with additional temporal conditions, were found to be more receptive to mobile ads.

Neighborhood effect, an economic and social science concept, posits that consumers who are geographically proximate to each other imitate the behavior of their peers (Choi et al. 2010). This is supported by the social impact theory (Latané 1981) which proposes that social impact is affected by the number of people, strength (power or social status), and immediacy. Zubcsek et al. (2017) found correlation between consumers' coupon redemption rates and co-location where consumers at the same place at the same time redeemed the same mobile coupon.

Consumer Context

The time-sensitivity of mobile communications makes it vital for messages to be beneficial to users at the exact moment they are received (Grewal et al. 2016). The stage a consumer is at on the purchase decision process (need recognition, pre-purchase activities, purchase decisions, and post-purchase activities) can be a major consideration for the effectiveness of mobile advertisements (Puccinelli et al. 2009). A consumer who has recognized the need for a product is a likely target for mobile ads. Likewise, a mobile ad may also draw a consumer away from a certain product or brand by presenting a better deal from a competitor's product (Fong et al. 2015).

Ad Element: Advertisement Type

Mobile advertisements are delivered through push- or pull-based approaches. Push-based ads, delivered through SMS or as push notifications from mobile apps, have been examined by previous studies (see Table 1) to show positive effects including increased coupon redemption and higher ad receptiveness. However, the intrusiveness brought to by push-based ads were found to hinder the positive implications of mobile ads (Xia and Sudarshan 2002). Pull-based ads, mobile ads that consumers "pull" by opening a specific mobile website or app (Grewal et al. 2016), put content to consumers who are ready to be sold to through Search Engine Optimization (SEO), pay-per-click advertising (PPC), or in-app ads. Since consumers have greater control over receiving pull-based ads, the privacy concerns they feel are less amplified, making them respond positively (Unni and Harmon 2007).

Research Model and Hypotheses

Our conceptual model (shown in Figure 1) modifies the Mobile Advertising Effectiveness Framework by Grewal et al. (2016). To empirically test this framework, we focus on crowdedness and neighborhood effect as the environmental context variables, perceived product need as the consumer context variable, and advertisement type as the moderating variable in determining consumer's response to mobile ads.

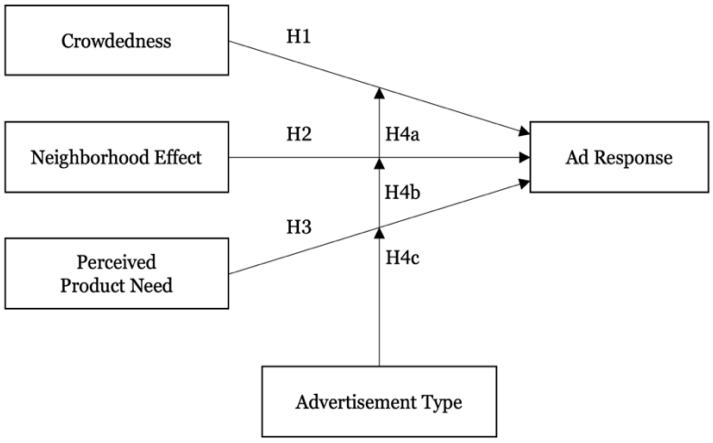

Figure 1. Research Model

Crowdedness invades personal space and restricts behavior, often eliciting negative emotions (Andrews et al. 2016). The behavioral constraint theory suggests that people may adapt to crowded situations by looking for a way to compensate for the spatial confinement they are in, leading people to escape into their mobile phones (Andrews et al. 2016). Thus, consumers who are in a crowded environment, at a certain threshold,

would tend to focus more on their mobile phones and less on the crowd around them, making it more likely for mobile advertisements to elicit positive response from them. This leads to our first hypothesis:

> **H1. Crowdedness, after a certain threshold, positively influences consumer's response to mobile advertisements.**

Geographical proximity among consumers elicit a neighboring effect where they tend to imitate the behavior of those around them. The social impact theory posits that a change in an individual's physiological state is a result of the presence or actions of other individuals (Latané 1981) in that people are pushed to act or behave a certain way according to the actions of people around them. Hence, we propose that providing an indicator of other consumers' positive response on a certain ad would elicit a positive response from another consumer looking at the same ad. We present our second hypothesis:

> **H2. A consumer is more likely to respond positively if he or she is shown an indicator of positive response from consumers in close proximity presented with a similar ad.**

Users engage more when messages are useful at the time of their receipt (Grewal et al. 2016). Topicality, or "the extent of which information is on topic and matches the user's domain of interest" (Xu and Chen 2006), is a critical factor in establishing relevance to users. Thus, consumption-related advertising messages are likely to be perceived as more congruent when the individual is in a consumer role, thinking and acting as a consumer (Banerjee and Dholakia 2008). When a consumer has a high perceived need to purchase a product, the more he or she will be driven to examine product options, and therefore, making it more likely for him or her to have a positive response on a mobile ad about the product. We present our third hypothesis:

> **H3. A consumer who has high perceived need for a product is more likely to respond positively on a mobile ad about the product.**

Consumers respond differently according to the type of advertisement they are shown. In the push format, the consumer has less control which tends to amplify privacy concerns, causing a feeling of intrusion to the consumer (Unni and Harmon 2007). Consumers are likely to perceive an ad as unwanted and irritating when it employs overly manipulative strategies (Ducoffe 1995). Thus, it is more likely that compared to pull-based ads, push-based ads would cause people to have a negative response on mobile ads, negating the effect of crowdedness, neighborhood effect, and perceived product need We present our fourth hypothesis:

> **H4a/b/c: Pull advertisements enhances {the effect of crowdedness, the neighborhood effect, the effect of perceived product need} on consumer's ad response than push advertisements.**

Lastly, we present a new contribution to the literature by examining an interaction effect of crowdedness, neighborhood effect, and consumer's perceived product need. Each previous study has examined individual impacts of context variables on mobile ad response but to date, there is limited holistic study that consider how these variables interact and affect each other. In this present study, we propose that when these variables are examined simultaneously, there exist significant interaction effects that influence consumer's mobile ad response. Determining the correlation of these factors would provide a direction for marketers to target consumers more efficiently. We then present our fifth and final hypothesis:

> **H5. There is joint influence of crowdedness, neighborhood effect, and perceived product need on consumer's mobile ad response.**

Proposed Methodology

This research will validate hypotheses by conducting an experiment that manipulates crowdedness, neighborhood effect, and consumer's perceived need for a product. A mobile app is to be developed where subject will be receiving ads. Here, ad response will be measured through per click of an ad, and location will be collected every time an ad is viewed by the user. Crowdedness will be measured through combining user location and time data with traffic data. Neighborhood effects will be manipulated by showing a message, "x number of people around you are viewing this ad", in the ads viewed by the user. Consumer's perceived need will be gathered through a preliminary survey where sample will be asked what products they are currently interested in and at what stage of the consumer journey they are in, this data will be used to determine which products to show in the ads. We will conduct multivariate analysis of variance (MANOVA) to investigate and measure the relationship between the variables.

Conclusion

The effectiveness of an advertisement is highly dependent on the consumer, thus, there is an apparent need to determine when, where, and what kind of advertisement is most relevant to the consumer. In this paper, we focus on determining environmental and consumer contextual factors that enhance the effectiveness of mobile advertising. Additionally, we also examine the moderating effect of advertisement type, and the interaction effects of these variables. Providing empirical evidence to how these contextual factors interplay on the effectiveness of mobile advertising would not only address the lack of research on the area but also allow marketers to design mobile advertisements that are relevant to the specific context of the consumer.

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